

AIR FORCE MATERIEL COMMAND
**LEADING
EDGE**

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New concept aircraft (Air Force Research Laboratory images)



The Next Century
of Flight



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AFRL engineer sails

EC-130J Commando Solo III makes first flight

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The EC-130J Commando Solo III aircraft recently flew for the first time at Palmdale, Calif., signaling a new era of support to Defense Department psychological operations missions.

The EC-130J's first flight inaugurates a 20-sortie flight test program where a combined Air Force, Lockheed Martin and Rockwell Collins team will prove the integrity of \$40 million worth of Commando Solo III modifications.

The EC-130J replaces the aging EC-130E Commando Solo II aircraft of the Pennsylvania Air National Guard's 193d Special Operations Wing based in Harrisburg, Pa.

The 193rd SOW is scheduled to receive three EC-130Js in 2004.

— ASC Public Affairs

AFFTC potential site for operational assessment

EDWARDS AIR FORCE BASE, Calif.

— In a recent site survey here, Air Combat Command, Defense Advanced Research Projects Agency and Boeing experts began the preliminary process for selecting a base for an Unmanned Combat Air Vehicle, the X-45C, operational assessment.

An operational assessment is designed to evaluate the UCAV's ability to meet requirements ACC set for warfighting capabilities. If Edwards is selected, the assessment is scheduled to run from 2007 through 2010.

Currently, ACC officials are still objectively evaluating potential bases to operationally assess more than 10 UCAVs.

Basewide support helped provide members from ACC information about Edwards, specifically its facilities, communications systems, logistics, operations security and services.

ACC officials will select which base will support the UCAV operational assessment after concluding its survey of all options.

— AFFTC Public Affairs

aboard carrier for research

ROME, N.Y. — An Air Force Research Laboratory engineer here recently hit the high seas looking into ways America could effectively and affordably prosecute 21st century combat missions.

Marc Pitarys, an electronics engineer in AFRL information directorate's embedded information systems engineering branch, sailed onboard USS John C. Stennis to become familiar with carrier suitability issues and understand carrier airspace, mission and flight deck operations as part of his duties as X-45 Joint Unmanned Combat Air Systems program technical director.

Known as J-UCAS, the Joint Unmanned Combat Air Systems program is a joint Defense Advanced Research Projects Agency, Air Force and Navy effort to show how technically, militarily and operationally feasible a networked system of high performance, weaponized enemy air defenses, surveillance and precision strike within the emerging global command and control architecture.

Pitarys observed flight operations in the landing signal officer's platform, catapult control and on the flight deck. He also observed command and control operations in the Stennis' primary flight control, where the air commander controls flight operations within five miles of the carrier, as well as visiting the carrier air traffic control center and combat direction center.

— AFRL Public Affairs

AEDC tests PW6000 engine for Airbus 318

ARNOLD AIR FORCE BASE, Tenn. — Testing on the PW6000 engine at Arnold Engineering Development Center will help Pratt & Whitney meet qualification milestones for scheduled entry into service in 2005 and assist with further engine development.

The PW6000 is a 4,950-pound, 108-inch-long, high-bypass commercial turbofan engine providing 18,000 to 24,000 pounds of take-off thrust. Airbus Industries selected the engine for their

Airbus 318 107-seat passenger aircraft, which has a flight range of up to 3,250



(Air Force photo)

Weightless experiment

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Travis Michalak (left) and 2nd Lt. Ryan Claycamp monitor an Air Force Research Laboratory Propulsion Directorate experiment aboard a specially equipped NASA KC-135A that simulates microgravity, or weightlessness, conditions in space. The two endured as many as 160 parabola flight maneuvers simulating weightlessness to find new ways of combating the ever-increasing problem of space thermal management — cooling powerful electronic devices used in space vehicles like satellites, the space shuttle and the International Space Station. Led by Dr. Kirk Yerkes, the team's challenge in the heat transfer and fluid mechanics engineering experiment is to remove the heat generated by the more powerful semiconductors and electronic devices that will power the next-generation of space vehicles.

— ASC Public Affairs

nautical miles.

While at AEDC, the engine underwent 64 test hours in the Aeropropulsion Systems Test Facility Test Cell C-2 to evaluate overall engine performance fuel consumption and handling characteristics. The tests are part of the required Federal Aviation Regulations Engine Certification qualification milestones for 2004.

— AEDC Public Affairs



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Around the command

☆☆☆☆ Gen. Greg Martin

Our goal is capabilities



In a flash, 2003 has come and gone, and with it the year's many challenges and successes.

Regardless of the situation, obstacle or challenge, our Air Force Materiel Command team came together and got the job done, keeping America's Air Force the premier power in the world. When you look at our military's ability to fight and the weapons and technology warfighters take to the battlefield, you can take pride in knowing you've made that happen. You carried out the AFMC mission by delivering war-winning, expeditionary capabilities to the warfighter: war-winning technology; war-winning acquisition support; and war-winning sustainment.

America's overwhelming success in places like Afghanistan and Iraq came riding in on your backs. Don't ever underestimate your value to this command, the Air Force or our great nation.

We did a lot in 2003. AFMC logistics operations reduced non-mission capable hours due to supply problems by 37 percent from September 2002 to the same time in 2003. This, in turn, reduced the Air Force fleet average total not mission capable rate for supply from 10.2 percent in fiscal year 2002 to 9.2 percent in fiscal 2003.

Our air logistics centers and their contract partners did not exceed planned expense rates in 2003, resulting in no final bill to the corporate Air Force for the first time in half a decade.

Maintainers at Robins Air Force Base, Ga., shaved four months off individual C-5 Galaxy programmed depot maintenance time which allowed them to deliver an unprecedented 23 aircraft back to the warfighter this year; 17 had been the previous high mark. They're doing similar things with the C-130 aircraft, and cut 30 days off PDM time for four Air Force Special Operations Command aircraft.

Maintenance professionals at Tinker AFB, Okla., did their part in finding new efficiencies. Because of that, they have more net serviceable fighter aircraft engines on hand than required to meet the Air Force's warfighting needs, a first since the Gulf War.

And the list goes on. Two F-16 aircraft, deliberately approaching each other head on during a test at Edwards AFB, Calif., went into automated maneuvers to avoid collision via the Automatic Air Collision Avoidance System. The ACAS will help alleviate midair collisions and save lives and tax dollars.

Experts at Eglin AFB, Fla., developed a Miniature Air-Launched Decoy that will entice enemy forces to prematurely disclose their air defense locations, keeping pilots further out of harm's way. And as F-16s flying missions in Operation Iraqi Freedom were having problems delivering their munitions, experts at Hill AFB, Utah, Edwards AFB and China Lake, Calif., worked together and found a fix an amazing 30 hours later. That's the kind of warfighter support our Air Force wants, needs and continues to get.

But 2004 is now waiting in the wings with a new set of challenges.

First among those is ensuring the programmed executive officer restructuring is successful. I think it has the potential for creating the most positive and important improvement in our acquisition capability since we established AFMC more than a decade ago.



Jason Mullis, sheet metal mechanic, works on a C-5 Galaxy pylon at Robins Air Force Base, Ga. Maintainers at Robins delivered an unprecedented 23 C-5s to the warfighter this year. (Air Force photo by Sue Sapp)



An F-16 Fighting Falcon flies a mission near Iraq in March 2003. Air Force Materiel Command designed a new operational flight program after learning F-16 pilots were having problems dropping their bombs. (Air Force photo by Staff Sgt. Cherie A. Thurlby)

Next, we have to make sure that, in the process of executing that restructure, we remain focused on developing Air Force capabilities. We've taken great strides in this area, but the programs and systems we develop should always be oriented toward the contributions they make toward enhanced capabilities. We'll be taking a good look at how we are structured to make sure we're as efficient in this area as we can and should be.

Thirdly, throughout this entire process, we have world-class science and technologies that will play into each of those systems. We have to make sure they are totally connected in every aspect of our weapon system development from concept to ultimate demilitarization.

To do that, we have to make sure that our people are continuing to develop and improve our expeditionary force structure. So, while we are restructuring to connect AFMC and our acquisition community better than ever before, and make sure they're focused on the capabilities in integrating technology, we're also

putting them out in the field as part of our expeditionary deployments, which is very exciting for the people because they're connected with what the warfighters are doing operationally.

And the next logical step be to make sure we're doing everything we can to develop our people for the responsibilities we want them to assume as time goes on. We must understand the expeditionary nature, the S&T priorities and capabilities and ultimately manage the program development so all those aspect and characteristics are considered.

This is exciting and I'm thrilled to be a part of it. I've always been amazed at what our AFMC team can accomplish as evidenced in the successes from 2003. Challenges lie ahead in this new year, but we stand ready to overcome them all through teamwork and dedication.

I'm proud to be your commander and am looking forward to the great things you're going to do in 2004. God bless you all, and God bless America.

"I'm proud to be your commander and am looking forward to the great things you're going to do in 2004."

2003 Successes

- ♦ Delivered 23 C-5s to the warfighter in record time
- ♦ Successfully tested Automatic Air Collision Avoidance System
- ♦ Developed air-launched decoy to force enemy disclosure of air defense locales
- ♦ Assisted F-16s during OIF in delivering their munitions

2004 Challenges

- ♦ Ensure success of Programmed Executive Officer restructuring
- ♦ Improve efficiency in developing Air Force capabilities
- ♦ Keep S&T connected during weapon system development
- ♦ Develop AFMC workforce for future roles



DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

Dear *Leading Edge* Readers

At the Air Force Research Laboratory, we are proud of our role as the Air Force's high-tech organization. We developed and transitioned awesome capabilities during the first 100 years of powered flight. Now, we're eager to stretch the limits of science, technology and imagination for the next 100 years. As a premier research laboratory, AFRL's vision remains steadfast — we defend America by unleashing the power of innovative air and space technology. But what does this mean, and what makes it happen?

With the consolidation of Air Force science and technology organizations in 1997, AFRL became a broad, far-reaching organization, covering areas ranging from sensors to materials; directed energy to information; air and space vehicles and the propulsion necessary for powering their flight; basic research to human effectiveness and munitions. By centralizing control of these assets through the formation of nine technology directorates and the Air Force Office of Scientific Research, the Air Force emphasized a freer flow of information and opportunities across the full spectrum of science and technology. And we increased our ability to offer integrated technology solutions to the challenges the Air Force faces in the 21st century. Working closely with the Air Force product centers, logistics centers and operational commands, we have also accelerated technology transition—speeding the flow of war-winning technology to our warfighters.

In pursuing the expanding frontier of science and technology, AFRL is powered by the world's best scientists and engineers — not only inside the Air Force, but also by our partners in industry and academia. Through the hard work and innovation of our national team, we integrate our technologies to provide the most advanced, most sustainable, most affordable warfighting capabilities possible.

Thanks to our broad technology program with its strong foundation, we've been able to adapt to new threats as they appear. A strong science and technology program is a great hedge against an uncertain future and is absolutely necessary for true transformation.

In this century, we will more completely integrate air and space. We will harness the great promise of nanotechnology and biotechnology. We will continue to exploit the great advances in information and sensor technology. Our operations in space will become more routine and expansive, as will the roles and capabilities of uninhabited air vehicles. And we will continue the emphasis on precision and effects in all of our weapons-conventional munitions, lasers and high power microwaves.

Thanks for taking the time to read through this month's *Leading Edge*. I know you will enjoy learning about some of the AF's leading edge technologies. As you read, though, remember that the real treasure is not the technology, but the dedicated, innovative men and women who create it.

Sincerely

PAUL D. Nielsen, Maj Gen, USAF
Commander, Air Force Research Laboratory

the future of



flight

An Air Force B-2 Spirit (Air Force photo)

In 1903, Orville and Wilbur Wright combined existing technology and early avionic research with a desire to reach the sky and stay there. The result? The birth of powered flight. One hundred years later, the Centennial of Flight celebration winds down. The time to acknowledge the past is done. Now it's time to look to the future of flight.

Tech. Sgt. Mark Kinkade Air Force News

Pilots maneuver aircraft by thought. Helmet-mounted heads-up displays project a virtual reality "soundscape" of the battlefield. Unmanned aircraft launch strike missions on enemy forces while small hand-held robots flit around war zones like gnats, projecting enemy movement back to command centers.

Once, such ideas were the stuff of futurist ponderings published in popular science and mechanics magazines. Today, Air Force scientists and others say the dreams of the future are only a few microchips away from reality.

"We're not looking at science fiction ideas here," said Kristen Liggett, a crew systems engineer with the Air Force Research Laboratory's human effectiveness systems interface division at Wright-Patterson Air Force Base, Ohio. "We're talking science fact. What can we do to improve aircraft today, not 50 years from now."

In other words, developers aren't looking forward to a day when technology will catch up to imagination. Today, technology is waiting for imagination to do what it does best: Create.

In the cockpit

Most advanced avionics research in powered flight today falls into three areas: Integrating the pilot and the aircraft more comprehensively, aircraft design and function, and aircraft construction.

For generations of people raised on images of gallant fighter pilots using guts, instinct and a compass to fly and fight against airborne enemies, the concepts many researchers are developing are as cold and analytical as a computer on an iceberg. Forget Tom Cruise jockeying his F-14 Tomcat fighter like a cowboy on amphetamines. The aircraft of the not-so-future will take "seat of the pants" flying out of the cockpit.

"Today's cockpit is an information center," Liggett said. "The pilot has to assess a massive input of data in seconds to determine a course of action. We need to make that process easier."



F/A-22 Raptor in flight. (Air Force photo by Tech. Sgt. Mike Ammons)

Instinct and courage are still in the equation, but pilots today also have much more information than pilots from other generations could have dreamed,” Liggett said.

Helmet-mounted environment and targeting displays are old news in the advanced avionics world. Now engineers are working on ways to create three dimensional environments within the cockpit by using sound and visual techniques.

For example, Liggett’s team is working on a project that will create a “surround sound” effect in the cockpit. When a threat appears, instead of a single monotonous tone beeping from the cockpit display, the tone will come from speakers in the general direction of the threat. The tone will act as a kind of reverse homing beacon, giving the pilot an auditory sense of which direction to focus his or her attention.

Also, scientists are looking at advanced voice control aspects of the cockpit, where a pilot will simply tell the aircraft what to do. Other projects involve look-and-shoot targeting and intelligence-aiding upgrades.

“To help the pilot do the job better, we look at ways to not only help with the physiological workload, but also the psychological workload,” Liggett said. “Technology gives us tremendous opportunity to maximize the pilot’s potential in the cockpit.”

Current research could also lead to the ultimate in pilot and aircraft cohesion: thought-controlled aircraft.

“There are those looking at ‘brain control’ of the aircraft,” Liggett said. “A pilot flying a craft by thought. It’s not as far-fetched as it seems.”

Wings of the future

In October 2003, the first operational F/A-22 Raptor fighter aircraft landed at Tyndall AFB, Fla., marking the official operational debut of the next generation of powered military aircraft for the Air Force.

The fighter joins the F-117 Nighthawk and B-2 Spirit as the

primary weapons in tomorrow’s air campaigns. Each aircraft was decades in development and represents the latest in technology advances.

But the air fleet of tomorrow may also include some veterans of campaigns past, most notably the B-52 Stratofortress bomber. Don’t be surprised to see it streaking across the skies on bombing missions 30 years from now.

“Amazingly [there are plans for] an unprecedented service life for the B-52H of 84 years,” said Williamson Murray, an Ohio State history professor who recently completed a study of future aircraft needs.

The B-52 could reach nearly a century of service through continued cockpit, avionics and other upgrades under research at various places, including AFRL. But the bomber isn’t the only aircraft researchers are planning for upgrades. There are already plans for updating the new Raptor’s cockpit.

“We’re talking about programs that will keep aircraft viable well into the future,” said Jan Walker, a spokesperson for the Defense Advanced Research Projects Agency. “As technology advances, we want to be in position to take advantage of anything that will make the aircraft a superior platform.”

Civilian companies are also looking to the future with new airframe designs in both fighter and transport aircraft. Northrop Grumman and Lockheed Martin, for example, unveiled a design for the research agency’s quiet supersonic program. The plane is a strike aircraft that can go more than twice the speed of sound and fly nearly 6,000 nautical miles unrefueled.

Boeing envisions a giant cargo aircraft called the “Pelican.” With a 500-foot wingspan, the aircraft is designed to fly at just 20 feet above the sea, giving it a longer range — up to 10,000 nautical miles over water. Plans call for the aircraft to carry up to 1.5 million pounds of cargo, or the equivalent of 17 M-1 Abrams battle tanks.

“It is much faster than ships at a fraction of the operational cost of current airplanes,” said Pelican program manager Blaine Rawdon.

Wings but no pilots

Unmanned aircraft are getting a lot of attention, particularly after the success of the Predator and Global Hawk in the war on terrorism. Light, fast, maneuverable and lethal without risk to a pilot, unmanned aircraft give war fighters a low-cost method of reducing an enemy threat.

Many research facilities are looking at various roles for future unmanned vehicles. Once primarily considered observation platforms, the use of such vehicles to hunt al Qaeda and Taliban forces in Afghanistan proved the vehicles can carry a lethal punch.

Some debate whether such aircraft will eventually replace manned aircraft. Most experts, however, agree the future Air Force will be a mix of both manned and unmanned aircraft, with the robot planes doing dirty details like flying into chemical contaminated environments, and long endurance reconnaissance and suppression of enemy air defenses missions.

“There are advantages and drawbacks to both,” said William Scott, a Colorado-based aviation consultant. “Missions for unmanned vehicles will gravitate toward those compatible with their primary strengths — persistence, expendability and stealth.”

Research is moving quickly to usher in a new generation of unmanned vehicles geared for combat missions. Called “unmanned combat air vehicles,” these pilotless planes theoretically will take on the complex — but extremely dangerous — suppression missions, clearing the way for manned vehicles to operate over enemy territory with less risk. The first such craft, the X-45A, completed its first flight at Edwards AFB, Calif., in 2002.

Scott sees both types of unmanned aircraft filling roles in homeland defense, as well. A small robot plane could easily and stealthily tail terrorism suspects, fly routine reconnaissance patrols in threatened areas and serve as airborne eyes and radar for ground security teams.

Within the Defense Department, testing continues on an unmanned helicopter that

can remain airborne for 30 hours. Also, researchers are looking at ways to use small unmanned drones as observation platforms for individual soldiers and small units in the field. As envisioned, a drone roughly the size of a milk jug could use helicopter dynamics to zip around buildings, through smoke and fog or over trees, hills and other obstructions to give soldiers a view of enemy positions.



The X-45C unmanned combat air vehicle, a concept aircraft based on the current X-45A, will have a larger payload capability, including the ability to carry two 2,000-pound joint direct attack munitions. The first flight of the X-45C air vehicle is scheduled for early 2006. (Photo by Defense Advanced Research Projects Agency)

We have the technology

Most aircraft design schemes call for advances on wing and fuselage shapes pioneered in today’s stealth aircraft. Some futurists envision aircraft without wings that maneuver by thrusters mounted in the fuselage. Others see radical revisions of old designs, like updates to biplane wing construction and advanced helicopter mechanics.



The Predator RQ-1 aircraft, from Aeronautical Systems Center, Wright-Patterson AFB, Ohio, is an example of the unmanned aerial vehicles on the cutting edge of technology. (Photo by General Atomics Aeronautical Systems)

Whatever the case, most futurists are drawing on existing technology to project future aircraft. John Peterson, president of The Arlington Group, a Virginia-based aviation think tank, sees a future when tiny robots build aircraft in seconds using a vat of goo and nanotechnology.

“Instead of making things from the top down,” Peterson said, “there’s a good chance we will make things from the bottom up.”

Essentially, Peterson sees a time when tiny robots roughly the size of a molecule with sensors, computer code and an articulated arm, reproduce themselves by the billions in fractions of second.

“For a given project, one of those tiny machines would be built and loaded with the very complex computer code that describes the material, shape, finish and other characteristics of the final product,” he said. “Then that first machine would make another of itself, the two make four and so on. In seconds, you would have literally billions of the machines.”

Then the machines would begin working on whatever project has been encoded in their computer code. Imagine a vat slightly larger than the average fighter jet. Technicians pump in a slurry of materials, organic compounds and other elements needed in aircraft production, but in liquid form. Now someone adds a single nanotech machine. Less than one minute later, a new fighter aircraft, built entirely from the elements in the slurry and by billions of tiny machines, stands in the vat.

Fantastic? Sure. Possible? Peterson thinks so.

“The significance of this possible revolution cannot be overestimated,” he said. “When the very essence — the atomic configuration — of materials can be determined, an extraordinary array of possibilities opens up in many areas.” □



In January 2003, AFRL Space Vehicles Directorate, Kirtland AFB, N.M., successfully launched the XSS-10 microsatellite aboard a Delta II rocket from Cape Canaveral. Once in orbit, the XSS-10 automatically maneuvered up close to and around another orbiting object, paving the way for future missions using microsatellites for satellite inspection, repair and refueling. Below, Senior Technicians Charlie Briggs (left) and Dan Wright with the XSS-10 which weighs less than 100 kilograms and looks similar to a Buick transmission. (Air Force photos)



Dr. Fred Schauer from AFRL Propulsion Directorate, Wright-Patterson AFB, Ohio, shows off the Pulsed Detonation Engine to aviation enthusiasts at an airshow in Oshkosh, Wis. The PDE — which may well be the first of its type to power an aircraft in flight — creates thrust by using a series of controlled explosions of fuel and air in tubes that look like long exhaust pipes. The engine could power future aircraft to speeds of up to Mach 4.5. (Air Force photo by Bill McCuddy)

The Airborne Laser, the nation's first laser-armed combat aircraft, is seen below in Wichita, Kan., where it underwent major modifications. Once operational, the ABL will be able to destroy a missile target hundreds of miles away, seconds after being launched. According to AFRL Directed Energy Directorate, the nose of the aircraft houses a 12,000-pound, 1.5-meter telescope that will fire the beam of laser light that is more than a million watts bright. The ABL is currently at Edwards AFB, Calif., where it is awaiting lasers and sophisticated optics to be installed as part of a test program that will prove the utility of high-energy lasers as standard weapons in the battlefields of the future. (Air Force photo)

Air Force Research Labs: *EXPLORING*



Dr. Paul Havig, AFRL Human Effectiveness Directorate, Wright-Patterson AFB, Ohio, demonstrates Variable Transmittance Visor technology at the October air show at Edwards AFB, Calif. The new technology allows pilots to select the amount of visor tint as lighting conditions change by simply turning a knob. VTV's could replace a broad spectrum of variably tinted visors currently in the Air Force inventory. (Air Force photo by Sue Sobieski)

Researchers at AFRL Materials and Manufacturing Directorate, Wright-Patterson AFB, Ohio, have developed flexible, organic-based solar cells (inset), which can be incorporated into tents like the one below, to determine the amount of solar energy that can be converted to electrical power. While still in the testing phase, researchers are hopeful they will be able to lighten the logistical burden of deployments by incorporating the solar cell technology in tent structures and even uniforms. (Air Force photos)



t h e *Possibilities*



In March 2003, AFRL Munitions Directorate developed and tested the largest precisely guided air delivered weapon in history. The Massive Ordnance Air Blast weighing 21,700 pounds and carrying 18,700 pounds of explosive is seen here moments before hitting a predetermined target on an Eglin AFB, Fla., bombing range with precise accuracy. (Air Force photos)



A microwave-related technology being developed at AFRL Directed Energy Directorate, Kirtland AFB, N.M., uses energy to "see" through walls and buildings and then sends back a signal that relays specific information on weapons concealed within. A portable version under development will be able to scan buildings at a distance. (Air Force photo)





Lt. Gen. Dick Reynolds takes over as AFMC vice commander. (Air Force photos by Al Bright)

New AFMC Vice Commander

2nd Lt. Tracy Page AFMC Public Affairs

Air Force Materiel Command's new vice commander joined the headquarters team here Dec. 8, bringing more than two decades of acquisition-related experience with him.

Lt. Gen. Richard "Dick" Reynolds has spent 25 of his 32 years in the Air Force in positions ranging from B-1 test pilot to B-2 Systems Program Office director to Program Executive Officer for Airlift and Trainers to commanding the Air Force Flight Test Center. He takes over AFMC's second-highest position after seeing "the business" from all aspects, including the past two and one-half years as Aeronautical Systems Center commander here.

"I've seen the changes that the command has faced and I've seen how the command has responded," Reynolds said. "I've also seen three different commanders and their approach to the AFMC mission. All that experience is absolutely invaluable in shaping what I think my role as vice commander will be and what I think AFMC needs to be today and become tomorrow."

Those needs, according to Reynolds, are to deliver to America's airmen the systems needed to carry out the Air Force's Distinctive Capabilities — air and space superiority, information superiority, global attack, precision engagement, rapid global mobility and agile combat support.

"It means delivering the tools of aerospace combat power - the sole reason our Air Force exists," he said. "Without AFMC's contribution to that, those distinctive capabilities would soon be hollow promises."

Reynolds believes his acquisition experience

and the operational experience from Gen. Greg Martin, AFMC commander, will meld into a perfect combination for continued AFMC success.

"I look back across my entire career, everything that I've done, all the airplanes I've flown, all the great experiences I've had, the places I've been and all the great technology I've worked with — I don't see any of that, I see the people."

Lt. Gen. Dick Reynolds

"General Martin has a very strong operational background with some very valid and deep experience in acquisition," Reynolds said. "So I think, in some ways, I do complement his experience. More so, I think the operational experience he brings to AFMC is exactly what we need."

But regardless of leadership's experience or education, true success lies with each individual in the command. This, according to Reynolds, makes people the command's, and the Air Force's, most precious resource.

"I look back across my entire career, everything that I've done, all the airplanes I've flown, all the great experiences I've had, the places I've been and all the great technology I've worked with — I don't see any of that, I see the people," Reynolds said. "I have a deep and abiding belief that people are our only resource."

Other major commands have very important capital equipment, but AFMC's true resource is its people - their professionalism, courage, creativity and willingness to

sacrifice and to do a tough mission day in and day out."

But as AFMC stares at the possibility of more than half of its civilian work force being eligible to retire in the next half decade or so, the people resource is growing harder and harder to hold on to. With that in mind, Reynolds said recruiting and retention are critical to AFMC's success.

"We need to provide a great place to live and work," he said. "This means a lot of things like good leadership, always building a spirit of teamwork and taking care of people. It means investing in quality of life and quality of work initiatives when and where we can. It means believing in living up to the ideal that organizational success begins and ends with people."

He also said the command's people need to continue to reinforce the concept of service, the Air Force core values and their meaning and the real importance of national defense.

"We need to take every opportunity to tell the Air Force story, its rich history, proud heritage and tremendous importance of the things we're doing today as well as the intriguing things we'll be doing in the future. This includes reinforcing our vision and goals, up and down the organization, as well as continuing to honor our traditions and ceremonies."

While Reynolds said he's motivated to succeed in his new job, he also tries to keep his life and its priorities in context.

"I'm someone who has tried to be a better servant of the Lord, better husband and father and someone who is working hard to be a good warrior airman," he said. "I'll be the best vice commander I can and together we'll meet success head on."

Working group releases report on AF Museum

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — An independent working group that reviewed the Air Force Museum's operational procedures in the aftermath of several artifacts being lost or missing released a report of its findings at the museum Nov. 18.

Retired Lt. Gen. Charles Cunningham, independent working group chairman, announced the group's findings during a press conference where he and Dick Anderegge, Air Force historian, fielded questions from area media.

Secretary of the Air Force, Dr. James Roche, chartered the working group to review the museum's collection management program, including its written guidance, processes, staffing, facilities and supervisory oversight.

The group's recommendations are to clarify the chain of command and responsibilities in that chain; create a board of directors in place of the current board of advisors; provide proper manpower for the museum workload; ensure people in the system are provided necessary training; and emphasize and resource a robust security activity, beginning with a comprehensive security review at all locations where the collection resides.

Additional recommendations included making better use of information technology for inventory control, records management and collection presentation; assessing the grade level of museum director's position to determine if it should be elevated to senior executive level; and updating Air Force policy statement to reinforce the importance of the museum's mission and formally name it as the National Museum of the Air Force.

— AFMC Public Affairs

AEDC temporary 'classroom' for Vanderbilt

ARNOLD AIR FORCE BASE, Tenn. — Seniors enrolled in an airplane aerodynamics course at Vanderbilt University recently traveled to Arnold Engineering Development Center to learn about aerospace ground test facilities and the role AEDC plays in advancing aerospace technology.

During the visit, the students, all majoring in mechanical engineering, vis-

ited the center's supersonic wind tunnel, the Aeropropulsion Systems Test Facility, the Aerodynamic and Propulsion Test Unit and the von Karman Facility.

The tour was designed to expose the students to experts who could provide technical information to supplement classroom lessons, and provided an opportunity for the students to learn about the variety of science and engineering jobs available in the aerospace industry.

— AEDC Public Affairs

Edwards' firefighters join California's wildfire fight

EDWARDS AIR FORCE BASE, Calif. — Mutual aid agreements with surrounding counties, as well as the California Department of Forestry and Fire Protection, allowed Edwards' firefighters to enter the battle against wildfires ravaging southern California Oct. 27.

A Defense Department asset, the Edwards' fire department could only contribute resources to the effort for 72 hours, per DOD regulations. The crew left Oct. 27 and returned Oct. 30.

A P-19 Crash Rescue Vehicle and three-person crew were dispatched to the Piru Air Attack Base, said Joe Ybarra, Edwards fire chief. The P-19 is an all-wheel drive firefighting vehicle that carries 1,000 gallons of water and 130 gallons of firefighting foam.

The fire was located 14 miles northwest of Santa Clarita. Structure protection was in effect for 300 residences and two commercial properties in the area.

— AFFTC Public Affairs

Robins security forces nab high-tech facility

ROBINS AIR FORCE BASE, Ga. — The 78th Security Forces Squadron cut the ribbon Nov. 10 on a new, high-tech control center that will enhance its command and control of emergency and contingency operations. The center combines law enforcement and security control activities into a joint operations center. It has the capability to electronically plot trouble areas. It also consolidates control panels for communications functions.

Technology, such as a new ArcView desktop mapping program, enables controllers to instantly plot cordons for emergencies like fuel spills or major accidents



(Air Force photo by Thomas Powell)

For the fans

EDWARDS AIR FORCE BASE, Calif. — Toby Keith visits with fans here during a visit Nov. 17. A crowd of about 400 filled a hangar to meet the country-music star. Keith was at Edwards to film his new video, "American Soldier," which debuted on the Country Music Television cable channel on Dec. 13.

— AFFTC Public Affairs

and provide suggested traffic control points at any base location.

— WR-ALC Public Affairs

AFRL awards local firm three-year contract

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — A three-year, \$1.9 million contract was awarded to Computer Sciences Corp., Fairborn, Ohio, by the Air Force Research Laboratory's sensors directorate to provide support for development of the signal processing evaluation, analysis and research facility located at AFRL's Rome Research Site, N.Y.

The firm's recent development at that facility included a high fidelity end-to-end simulation of a Discriminating Interceptor for the Air Force's discriminating interceptor technology program.

AFRL partners with Computer Sciences Corp. in developing new technological advancements.

Applying state-of-the-art computers to process sensed signals from radar, lidar, or imaging cameras are considered the general expertise of CSC. CSC is a worldwide organization and has supported AFRL for more than 30 years.

— AFRL Public Affairs

JSIPP adds to Robins' defense

Holly Logan
WR-ALC Public Affairs

The Joint Service Installation Pilot Program is putting biological and chemical detection capabilities to the test — adding another layer of protection at Robins Air Force Base, Ga.

JSIPP, a four-part biological and chemical detection system, is a congressional program designed to help protect military installations in a post 9/11 world.

With changing world conditions, the one-year pilot program targets U.S. forces' changing force protection needs, according to Dean Soderberg, process analyst for the C-130 maintenance branch, and former Robins JSIPP point of contact.

"Prior to 9/11, there was no defense of this kind for any installation," he said. "So, post 9/11, DOD said we're just as vulnerable as every other city. Before, the fight was only overseas, but now the fight is at the gates of Robins."

A host of Robins emergency response agencies have been involved with the program since its beginning.

The system will include more than \$750,000 in portable biological and chemical detectors, dry filters and personal protective equipment, such as masks, suits and boots, and \$120,000 in satellite communication equipment for emergency responders.

Soderberg explained the program is a "detection to treat" system, not a "detection to prevent" system.

"This isn't meant to prevent these attacks," he said. "It's a system that helps us know within four hours what hit us, if any-

thing ever does, so we can know how to treat people."

While Robins isn't the only military installation taking part in the program, it's the first Air Force base to receive the program's complete biological and chemical defense package.

"Robins was chosen by Installation Logistics at the Pentagon, based upon Robins' hazardous material capabilities established here in the last five years," he said. "If all goes well with this pilot program and all the tests go well, DOD will stand up the Guardian — a \$1 billion program for 100 installations to do the same thing."

Last spring, Soderberg attended a meeting in Washington, D.C., that resulted in Robins being chosen.

According to Master Sgt. Kevin Treas, readiness flight superintendent, and current JSIPP point of contact, the system will be located throughout Robins, with command terminals at the command post, and other areas across the base. Contractors will be here until October 2004 to determine if any problems are due to equipment malfunction.

The two said the system's presence shouldn't create an uneasy feeling in the community.

"This is primarily being pushed after terrorists attacked the U.S. without warning," Treas said. "It's not meant to raise the alarm that there's a biological or chemical threat. It's just here to further protect our people and resources if it were to ever happen."

The Defense Threat Reduction Agency and Soldiers Biological Command from Fort Leonard Wood, Mo., will return to help Robins perform exercises to further test the program, as the test program's time ends here.



Staff Sgt. Michael Robertson, 78th Civil Engineer Squadron, Robins AFB, Ga., digs a trench for underground utilities for the Joint Service Installation Pilot Program portable laboratory trailer. (Air Force photo by Sue Sapp)



Tech. Sgt. Jason Fass, air traffic controller at Hill AFB, Utah, zooms in on a computer image of a building located on Hill's flightline using the new simulator designed to train air traffic controllers. (Air Force photo by Beth Young)

Simulator will improve air controller training

Creating realistic environmental conditions expected to reduce training time 50 percent

Master Sgt. Sonja Whittington
OO-ALC Public Affairs

Air traffic controllers at Hill Air Force Base, Utah, can train in a more realistic environment and get new people up to speed in half the time thanks to a new, high-tech simulator.

Air traffic controllers from the 75th Operations Support Squadron at Hill will use the simulator, one of only six in the Air Force, to train their members on the unique characteristics of Hill and surrounding air space, according to Tech. Sgt. Jason Fass, an air traffic controller who's overseen the simulator's installation.

Fass said the simulator is very much welcomed because air traffic controllers must be certified at each location they work due to unique environmental characteristics. It will reduce that training time

for newly assigned controllers by up to 50 percent.

By inputting photographs from the Hill tower, the simulator provides a true-to-life

"This is the best air traffic control simulator in the Air Force."

— Tech. Sgt. Jason Fass

270-degree view of the surrounding Utah landscape, Fass said. The computer can swing the view completely around so the trainee can see 360-degrees around the

tower allowing him or her to monitor aircraft approaching from any direction.

Costing close to \$800,000, the simulator is composed of three operating systems and 17 computers. Fass said these integrate together to create a realistic training environment for the air traffic controllers.

"This is the best air traffic control simulator in the Air Force," he said.

Fass said all air traffic control units will eventually have a similar simulator. The Hill unit is the second in Air Force Materiel Command; the first went to Eglin AFB, Fla.

Air traffic controllers at Hill provide service to aircrews from five major commands. Hill tower is responsible for more than 50,000 operations a year, supporting three combat F-16 squadrons, along with A-10s, C-130s and KC-135s, according to Fass.

In addition to that workload, Hill helps support both the U.S. Forest Service and Air National Guard fire fighting missions during the summer by providing its use as a tanker base. Last year alone, Hill helped support 335 of these missions, Fass said.

Hill's new simulator can incorporate every airframe in the Air Force inventory as well as most civil aircraft airframes into a scenario, creating the realism necessary for air traffic controllers to gain the skills needed for controlling aircraft at Hill, he said. And training can be done at any time.

Without the simulator, "we can only train when we're flying, and we don't fly 24-hours a day," Fass said.

The simulator links voice commands to the video when trainees speak into the microphone.

"The computer has to synchronize with your voice," Fass said.

With the simulator, air traffic controllers are taught certain phraseology for controlling aircraft, and simulated aircraft pilots respond according to the voice command the trainee gives.

"If you use the wrong word, the computer will give you feedback," Fass explained. "You have to use the commands verbatim."

In the future, controllers hope to be able to simulate temporary duty locations to reduce the time needed for controllers to upgrade when deployed.

"We can learn to control their traffic before we get there," Fass said."

AFSAC works to make the grade

Kyle Combs
AFMC Public Affairs

The commander of the Air Force Security Assistance Center has taught his employees that report cards aren't just for students anymore. That's because it's not unusual for Brig. Gen. Jeffrey Riemer, AFSAC commander at Wright-Patterson Air Force Base, Ohio, to give them a pop quiz on the center's strategic map.

"World-class professionals fostering global partnerships through developing and executing international agreements by delighting customers, linking resources, reengineering processes and strengthening the organization," is the answer he's looking for. These are the words Riemer said are the center's strategic map.

Those words explain what the center wants to become and are a part of what AFSAC calls "strategic architecture" — described as a communication tool decreasing complexity of change and promoting the Balanced Score Card initiative.

The initiative was implemented Oct. 1, but the planning began long before that by a core group of AFSAC employees that began meeting last January.

The BSC is a management tool designed by Harvard Business School professors, Robert Kaplan and David Norton. Their research showed that CEOs need a broad view of things that are

important in affecting company success, Riemer said. BSC requires strategizing the future of an organization from various perspectives — customer, financial, internal processes, learning and growth.

"We think we've gotten to the point where we understand it very clearly here at AFSAC, and we've adapted it to meet the needs of our government organization," Riemer said.

The adapted perspectives for AFSAC are customers, resources, internal processes and organizational. After the core group of planners determined the perspectives they would work from, they had to formulate strategic maps with objectives, forms of measurement and yearly targets.

From these perspectives, it is expected AFSAC will enhance customer service, better utilize resources, improve internal process efficiency by using Six Sigma and Hammer initiatives and strengthen the organization by providing a positive employee climate and training initiatives.

It doesn't stop there — the perspectives are tied to the command themes:

- Be innovative, adaptive and responsive.

- Be easy to do business with.

- Be effective and efficient.

- Have an expeditionary mindset and culture.

Then, under each of these themes, objectives of AFSAC's perspectives will be measured. Those measurements include operation cost improvement, and



Brig. Gen. Jeffrey Riemer
AFSAC commander

percentages of workforce certified in international affairs, key and enabling processes achieving goals and favorable customer reports.

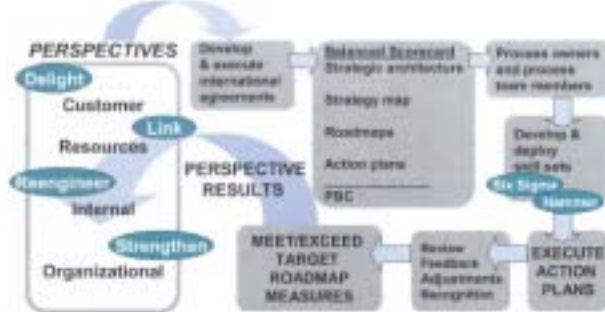
Focus is the key to BSC and "not letting today's crisis overrule tomorrow's strategic thinking," Riemer said. "If you don't carve out a certain percentage of your time and dedicate it to strategic-thinking, Balanced Score Card implementation and measurement tracking, you'll be overcome by day-to-day crises that allow the best laid plans to run amuck."

According to Riemer, it's time to apply BSC because 30 percent of the center's 330 civilians will be eligible to retire in five to six years, causing the center to lose much of its expertise faster than it can recruit and train new employees.

A strategy-focused organization is one that looks to the future, determines their vision and how to fulfill it. Then they structure a way of ensuring that end state, Riemer said.

"We think the result will be that any employee in the organization can stand back six months or a year from now and say, 'Wow! I see exactly how this works. I see how what I do every day is making a difference,'" he said.

So as Riemer continues to quiz AFSAC employees on the positive results of their actions and work towards continued success, the report cards will "make the grade."



The AFSAC vision is displayed above. AFSAC strives to become a center of world-class professionals fostering global partnerships. This vision will entail delighting customers, linking resources, reengineering internal processes and strengthening organization.

The Dignity Memorial Vietnam Wall Experience display visits Robins



ROBINS AIR FORCE BASE, Ga. — Veterans of wars past, future soldiers as well as civilians from around Middle Georgia experienced something much bigger than themselves Oct. 31 through Nov. 2, during the Dignity Memorial Vietnam Wall Experience display. The traveling replica of the Vietnam Veterans Memorial in Washington, D.C., may be only a fraction of the size of the original, but holds the same meaning for hundreds of thousands of veterans. During its three-day visit to Middle Georgia hundreds viewed the wall. Top left: The Bibb County postmaster unveils the new Vietnam Veterans Memorial stamp. Top right: Airman 1st Class D. Preston Stelick, 330th Combat Training Squadron, salutes during the national anthem. Left middle: Middle Georgia high schools, veterans groups and other organizations present wreaths during the opening ceremony. Above: Melinda Hagy makes a rubbing for her grandfather. Left bottom: Wendy Jones and her son, Caleb, 2, look at some of the names of Americans who served. (Air Force photos by Lanorris Askew)

AEDC members deploy to 'Camp Warlord'

Military members assigned to the United States Air Force's Arnold Engineering Development Center, Arnold Air Force Base, Tenn., packed their deployment bags and hit the road Oct. 22 for a trip to Camp Warlord at Little Rock AFB, Ark. The troops deployed for three days of intense training designed to help ensure each person is ready to deploy if and when the time comes.

"A trip like this to Camp Warlord prepares AEDC's military to deploy," said Col. David Eichhorn, AEDC commander. "It's the most realistic deployment training anywhere, short of actual deployment. This kind of exercise builds leadership and confidence in the team and its individuals."

The exercise combined 63 forces from Arnold with 45 military members from Little Rock to simulate performing duties at a deployed location. For the basis of this training exercise, the groups were supposedly deployed to South Korea due to rising hostilities with North Korea.

When the buses arrived at Little Rock, the members were told to don their Kevlar helmets and web belts, complete with canteens and gas masks, for the one and a half-mile trek to Camp Warlord. After instruction from Marine instructors on the tactical movement of troops, the group was off, making its way to the camp. About halfway to their destination, snipers ambushed the group sending everyone diving for cover.

The group had just received its first lesson of the deployment, finding out that threats can come from anywhere at any time.

For the next three days the group took part in intense training from before sunrise to well after sundown. The exercise portion of the deployment focused on alarm conditions and mission-oriented protective postures levels. Members also covered the entire spectrum of training, including aggressors, Code of Conduct, self-aid and buddy care, chemical warfare, Law of Armed Conflict, combat arms, unexploded ordnance detection, shelter hardening, tent construction and

Office of Special Investigation perspectives. In addition, instructors put the members through several simulated air-base attacks.

The entire time the troops were in camp they had to be aware of any "unauthorized personnel" trying to infiltrate the site. According to instructors, the deployed troops met each potential terrorist situation exactly as they should have, ensuring no saboteurs were able to penetrate the camp.

Three members from AEDC played an integral part in making sure the deployment went smoothly. Lt. Col. Mark Teskey served as the deployment director for AEDC, acting in concert with the Camp Warlord staff from Little Rock. Alongside Col. Teskey were Capt. Frank Marconi and 2nd Lt. Chris Lohan, who also served as Camp Warlord Cadre members for the instruction and evaluation of the deployed troops.

According to Marconi, the deployment helped the AEDC military members learn specific skills necessary to survive in a deployed environment in today's expeditionary Air Force. "It (the exercise) brought everyone together, regardless of specialty, to learn and practice basic warfighter skills. Instead of concentrating on a particular job specialty, it focused on basic survival skills needed in a wartime environment," he said.

The three days of Camp Warlord training culminated with the running of the confidence course, "The Rock," that tested the physical and mental stamina of everyone who participated.

After the group from AEDC and Little Rock completed the course, Eichhorn addressed the formation of troops who were wet, muddy, tired, scratched, bruised and happy to be finished with the course.

"This course we just finished is here to build confidence, not only in yourselves, but in your fellow airmen who ran it with you," Eichhorn said. "Look around you. The people you see are people you can trust and people you can count on, and I am proud to serve with all of you."

— Tech. Sgt. Bob Pullen, AEDC Public Affairs



Three Hill AFB, Utah, couples — Brian and Kristina Head, Tom and Kristina Pina and Gregory and Rebecca Senkel — show off their spouses' future captain bars. They all will pin the new rank on in May. (Air Force photo by Beth Young)

A tale of six new captains, three couples

It's not unusual for married couples to do things together — golf, vacation or even cook. However, three married couples at Hill Air Force Base, Utah, have taken togetherness to whole new level.

They're not only serving their country in the Air Force, but they all have recently been promoted to captain. That may not seem so odd, until you realize that all six of them pin on the exact same day.

"It wasn't a surprise that my husband and I were promoted together since we were in the same class at the Academy and were commissioned on the same day," said 1st Lt. Rebecca Senkel. "However, three couples on one base with the same circumstances seem pretty unusual."

The other members of this unique trio include Rebecca's husband, 1st Lt. Gregory Senkel, and their friends, first lieutenants Kristina and Brian Head and Tom and Kristina Pina.

The coincidences don't end with the promotion. The Senkels and Pina's went to

the Air Force Academy together and Tom Pina and Brian Head work together at Hill's mature and proven aircraft directorate.

"Another odd thing about this group is that Rebecca, Kristina and I, all work in the same directorate (ICBM System Program Office)," said Kristina Pina.

The couples are different in many other aspects, such as how long they've been married — from just more than one year to more than four years — and the Senkels are the only ones who have child. As with any marriage, there are ups and downs. However, with both husband and wife in the military, it can add a different twist on things.

"It can be useful having a spouse in the same career field, because they understand what you do at work. The downside is the temporary duty assignments, which is part of why we are waiting to have children until after we get out," said Kristina Head.

"In the past, it seemed as though the

Air Force would send you wherever they needed you, but now they have put an emphasis on keeping married couples together and happy. I think that retains us longer," said Tom Pina.

All of the couples said they've been lucky enough to be stationed together. But with TDYs and deployments, they definitely get the chance to miss each other.

"The toughest part of us both being in the military is that there are twice as many TDYs, so we're apart more than we would like, but it's also provided us a lot of opportunities to travel," said Kristina Pina.

One of the up sides to being promoted together is that when the time comes — a May 31 pin-on date — they have someone to celebrate with.

"As for celebrating, we'll most likely have a big party, although there's still awhile until we pin on. I'm hoping we'll have some family out here to help us celebrate as well," said Kristina Pina.

— Beth Young, OO-ALC Public Affairs

2nd Lt. James Coulter, Arnold AFB, Tenn., crawls through a water and mud-filled "chute" during a confidence course following a three day exercise named Camp Warlord at Little Rock AFB, Ark. (Air Force photo by Tech. Sgt. Bob Pullen)



Bill Bertrand, a physicist at Arnold AFB, Tenn., takes a break during a trip down the St. John's River last fall. He and four friends took the journey of more than 700 miles in a 28-foot pontoon boat, and followed a section of the route taken by the 1804 Lewis and Clark Expedition. Bertrand's love of boating goes back to when his father took him fishing as a young boy. (Courtesy photo)

AEDC employee dreams of traveling the 'Great Circle'

Philip Lorenz III
AEDC Public Affairs

Bill Bertrand's passion for adventure took him and four long-time friends on a journey of more than 700 miles down the Missouri River in September 2003. In a 28-foot pontoon boat, the five-man crew followed a section of the route taken by the famed 1804 Lewis and Clark Expedition.

"I carried a copy of *Undaunted Courage* with me," said the physicist who has worked at Arnold Engineering Development Center, Arnold Air Force Base, Tenn., for more than 32 years. "What's great is you can read this account, then look across the river and

say 'man, that's where this took place.' It's just amazing how they made that trip with only losing one guy."

Stephen Ambrose's *Undaunted Courage* is a narrative of Meriwether Lewis and William Clark's epic journey down the Missouri River to the Rocky Mountains and then on to the Pacific Ocean and back to where they began. The expedition, initiated and largely organized by President Thomas Jefferson, served to open up the western territories to settlement by the young nation.

Bertrand and his fellow explorers traveled at the sight along the shore of a 100-foot high, white stone obelisk that serves to memorialize Army Sgt. Charlie Floyd, who was the historic expedition's

only fatality.

The trip down the Missouri River was by no means Bertrand's first boating adventure.

His love of being on the water began when he was a young boy.

"My dad and I used to fish on the Elk River, south of Pulaski," he said. "We had a little old wooden boat with a seven-horse power outboard motor. Whenever he would let me drive the boat, I was in heaven."

The Pulaski native also has adventure running through his veins when it comes to his career.

"I started out in the old Engine Test Facility research branch," he recalled.

"Early on, we measured the plumes of cruise missiles. We had a test in 16T with more than 40 optical instruments — quite an accomplishment in those days. Some of them we had built ourselves — a lot of the instruments were 'homemade.'"

"Primarily in the technology area, we get a variety of jobs to work on, something different all the time. I definitely enjoy that."

The final frontier

"The main work we're doing now is evaluating the effects of the space environment on spacecraft materials used in satellites — we are mainly doing spectroscopy," he continued.

"We've done a couple of jobs recently where we take a certain amount of this spacecraft material, typically about 10 to 15 grams, and put it in a heated cell. As we increase the heat of the material out-gases, and we collect it on a cryogenic optical surface. We check it spectrally, to analyze how it effects the infrared properties of the optics and also how it might effect a sensor in a satellite."

Get Bertrand started on the topic of boating and he transforms into a true sailor with plenty of "sea stories."

After finishing his graduate studies, Bertrand finally had the quality time to devote to his pursuit of boating. He and Bryan Seiber, who also works at AEDC, started doing some serious water skiing. From there, Bertrand went "head over keel" into boating.

"I had a copy of *Popular Mechanics*, with an article on how to build a houseboat in it," he explained. "I was living in a little apartment over on Chamberlain Drive in Tullahoma, Tenn., when I built this thing. It was a 24-foot boat — I built two 12-foot sections in my living room. Then I attached the sections together in my front yard."

He built two more houseboats, both with hulls of ferro-cement.

Through the years

Over the years, Bertrand has owned three houseboats, two ski boats and one fishing boat. As a result, Bertrand has shared his interest with two separate groups of friends, one of which enjoys water skiing, and the other that has made annual trips via pontoon boat on some of America's largest waterways, including the

Tennessee, Mississippi, Missouri, Ohio, St. Johns and Cumberland rivers.

Covering many miles

According to Bertrand, he and his boating cohorts have traveled more than 4,000 miles by boat over the years.

"There are 18,000 miles of navigable rivers in the United States — so I got some more to go," he said. "I've really enjoyed boating and being on the water. That is the great thing about rivers — around every bend is something new."

"It's still my hope to do what is called the 'great circle.' If you start somewhere, say Memphis, you go down to New Orleans, cross the Gulf, around Florida, all the way up the intercoastal waterways to New York."

"From there you can go up the Erie Canal into the Great Lakes, back to Chicago and down the Illinois and the Mississippi River to where you began. It takes about four months to do — I'll probably have to wait until I retire."

Rocky sailing

He is the first to admit it hasn't always been smooth sailing.

"We've punctured a hole in the pontoon more than once. The first Mississippi trip we were headed from New Orleans, La., to Mobile, Ala., toward the Gulf and the engine blew up. We noticed we were floating toward Cuba — within an hour, this man and his family were heading to the Gulf to go fishing. They came by and offered to tow us in — it took him four hours and all he would take was gas money."

Another dream he has is the vision of living on a houseboat. "My wife and I spent a week out there (on their houseboat) one time for a vacation, and that was enough for her," he said laughing. "I'm still trying to convince her that it's what we're going to do upon retirement."

Bertrand earned his bachelor's degree in physics from the University of the South in Sewanee, Tenn., and a master's degree in physics from the University of Tennessee Space Institute.

He and his wife Betty live in Tullahoma. They have a son, Collin, and daughter-in-law, Teresa. Besides being an avid boater and water skier, Bertrand also is a licensed private pilot.



This 100-foot tall obelisk serves as a monument to Army Sgt. Charlie Floyd, who was the only fatality on the famous Lewis and Clark Expedition of 1804. (Photo by Bill Bertrand)

Tinker airman wins top Air Force honor

TINKER AIR FORCE BASE, Okla. — For one Tinker Air Force Base service member, a career in the Air Force is turning out to be one big ceremony.

Staff Sgt. Douglas Picard knows his job as assistant non-commissioned officer-in-charge of the honor guard at Tinker. As Air Force Honor Guard Member of the Year, he's at the top of his game.

Picard, tapped as Air Force Materiel Command Honor Guard of the Year in May, accepted the inaugural Air Force-level award Aug. 21 during the Air Force Sergeants Association Convention.

Picard's original participation in the honor guard was in addition to his regular duties — a backshop avionics technician in the 552nd Component Maintenance Squadron. As his involvement with the group increased, he had an opportunity in August 2001 to serve a three-year, special-duty tour on the honor guard.

— OC-ALC Public Affairs



Experiencing a military funeral firsthand when he laid his grandfather to rest convinced Staff Sgt. Douglas Picard that his service in the Honor Guard was worth the sacrifice. Now Air Force Honor Guard Member of the Year, Picard takes every aspect of his job seriously, even inspecting the M-14s used for 21-gun salutes. (Air Force photo by Margo Wright)

Engineer finds solution for safety concern, earns cash

TINKER AIR FORCE BASE, Okla. — When safety concerns surrounding NATO's fleet of E-3 Airborne Early Warning and Control Systems aircraft mounted, a Tinker engineer knew time was of the essence.

So rather than accept the required three-month lead time for a contracted tear down analysis, Khoa Nguyen, a lead electronics engineer with the E-3 System Support Management Division, International Support Branch, came up with his own plan to have the testing performed locally.

The idea eventually saved the U.S. government nearly \$100,000 and earned him \$10,000 through the Innovative Development through Employee Awareness program.

NATO was experiencing an overheating condition on the R933 radar power contactor relay and M683 electrical load control unit control system and there was evidence that they were on the verge of having a full-blown fire in the cabin.

A contractor was originally scheduled to perform the analysis, but the estimate was more than \$236,000 and would have taken up to three months to complete.

Nguyen thought the three-month lead time was unacceptable and checked with

the Avionics and Electronics Engineering Division at the Oklahoma City Air Logistics Center to see if the testing could be done organically. Nguyen used laboratory facilities, and he provided NATO's Force Command the tear down results about a week later, saving the U.S. government \$96,785 over the original proposal.

Nguyen said his idea to have the relay tested locally instead of externally will also help the U.S. E-3 AWACS fleet because both platforms are very similar.

— OC-ALC Public Affairs

Mechanics earn thousands for new F100 tool design

TINKER AIR FORCE BASE, Okla. — Two Tinker men recently shared a \$10,000 Innovative Development through Employee Awareness program award for designing a tool that boosts daily F100 engine bearing repair production by a factor of eight.

Co-workers Robert May and Loitrell Perry of Tinker's engine division rework shop, invented a "multi-purpose fixture for bearing removal and installation" that saves the Air Force more than \$76,833 a year, according to Tinker IDEA program officials.

According to May and Perry's IDEA award summary, the only way to remove

and install the F100's bearings before the duo got involved was to use three different tools the engine's manufacturer provided. But those tools caused more problems than they fixed, the men agreed.

The two men developed a kit that included precision tools for each job. Tinker engineers also helped with the design, recommending a sleeve to provide added support to a critical area. Perry and May then took the drawing and specifications to Michael Bartholomew, who did the tooling on the first of two kit prototypes.

Tinker ground safety experts witnessed several demonstrations of the kit in use. Now a worker can install or replace 10 or more bearings in an hour — and the tools don't break.

— OC-ALC Public Affairs

Commendation awarded to captain for heroic rescue

BROOKS CITY-BASE, Texas — Air Force Research Laboratory Capt. Melvin Harris was awarded the Air Force Commendation Medal for a heroic performance in aiding victims of an automobile accident earlier this year during a ceremony held here Oct. 14.

Harris, a high energy laser deputy program manager, drove southbound on Interstate Highway 35 Jan. 9 on his way

to Brooks when he witnessed a north-bound car lose control, impale into a guardrail, and flip upside down. He pulled over, grabbed his first-aid kit and jumped over the divide to reach the car. Flagging down a passer-by, he directed them to call for emergency assistance.

He then cut the restraints on the children in the backseat and got the conscious male to safety, administering first-aid to the wounded. Onlookers helped pull the severely injured woman from the vehicle.

His immediate reaction and valiant efforts were honored at the commander's call Oct. 14, with the presentation of the Air Force Commendation Medal

— AFRL Public Affairs

653rd CLSS commander awarded Bronze Star

ROBINS AIR FORCE BASE, Ga. — Lt. Col. Paul Wood, 653rd Combat Logistics Support Squadron commander, was presented a Bronze Star Medal Oct. 9.

Wood, 653rd CLSS commander since July, earned the medal for directing maintenance operations of more than 1,000 Air Force, Marine and Navy maintenance service members maintaining combat readiness of 150 aircraft in support of Operation Iraqi Freedom.

He did so while serving as the 363rd Expeditionary Maintenance Squadron commander at Prince Sultan Air Base, Saudi Arabia, during a one-year remote assignment from November 2002 to April 2003.

— WR-ALC Public Affairs

Drug Demand Reduction Program wins DoD award

EDWARDS AIR FORCE BASE, Calif.

— Edwards' Drug Demand Reduction Program received the 2002 Secretary of Defense Community Drug Awareness Award at the Pentagon. The Secretary of Defense Community Drug Awareness Award is an annual award presented to only one base within each branch of the armed forces.

The DDR program works to discourage drug use and alcohol abuse on bases through education awareness. Examples of DDR program initiatives include the Commander's Club Drug Tool Kit, which serves to raise commanders' awareness on the increase usage of popular club drugs. Another initiative is the Leadership

Substance Abuse Course, which provides mid-level and upper level supervisors with training to address substance abuse problems within their organizations.

In addition, all newcomers to Edwards are required to attend an outreach briefing that addresses the drug and alcohol prevention, identification and treatment referral procedures. Also, outreach partnerships between DDR and base and community agencies have also played a major role in the program's success.

— AFFTC Public Affairs

AFMC colonel awarded Bronze Star for OIF

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — An Air Force Materiel Command colonel recently received the Bronze Star for achievements during Operation Iraqi Freedom.

Col. Eugene Collins, AFMC's logistics directorate depot maintenance division chief, served for 10 months as the 363rd Expeditionary Maintenance Group commander at Prince Sultan Air Base, Saudi Arabia. He commanded nearly 2,000 combined forces personnel who maintained mission-readiness for nearly 180 aircraft.

Collins is a visionary and high-energy leader according to officials who penned the citation given at the medal ceremony. Those officials wrote that Collins worked closely with 16 independent maintenance teams from other nations. He also communicated daily in a diplomatic capacity with leaders of the Royal Saudi Ministry of Defense and Aviation and the Royal Saudi Air Force to obtain critical equipment to successfully complete his maintenance mission.

Collins said he and his team worked around the clock. Their assigned aircraft flew for 16,500 hours for more than 3,100 missions — creating a lot of room for error. Despite it all, he said he's proud that not one aircraft or individual was lost under his command.

— AFMC Public Affairs

Auto ACAS test team receives flight safety award

EDWARDS AIR FORCE BASE, Calif.

— The Automatic Air Collision Avoidance System test team recently received the Tony LeVier Flight Test Safety Award for its exceptional contribu-

tion to flight test safety during 2003.

The team, made up of 32 core flight test members and more than nine different organizations, was presented the award at the Society of Experimental Test Pilots conference in Los Angeles, Sept. 25-27.

The Auto ACAS is an algorithm, or computer program, which detects a potential airborne collision, chooses the optimum avoidance maneuver and sends an avoidance command to the aircraft's autopilot.

Currently, the program is in data reduction, with the final report scheduled for publication in the first quarter of 2004

The development and flight test of the Auto ACAS has been an international cooperative effort between the Air Force Research Laboratory, Sweden's FMV (Försvarets Materielverk), Lockheed Martin, Saab, Bihlre Applied Research, Veridian, Boeing and NASA Dryden Flight Research Center.

— AFFTC Public Affairs

Test pilot school wins 2003 Richard G. Cross Award

EDWARDS AIR FORCE BASE, Calif.

— The U.S. Air Force Test Pilot School here received the 2003 Richard G. Cross Award Nov. 19 in Lihue, Hawaii.

Presented by the International Test and Evaluation Association, the award recognized the contributions the school's short courses made to the training and education of test and evaluation professionals.

The school's instructors worked with test organizations to address shortfalls in required training for their respective fields. The units were from the 412th Test Wing, 53rd Electronic Warfare Wing, Air Force Materiel Command, the Air Force Research Lab and the Air Force Space Command. Other organizations that participated were from the Air Force Operational Test and Evaluation Center, the Space and Missile Center and NASA. School officials developed and refined 12 unique courses to address the shortfalls.

The short courses started in July 2002, and have produced a total of 169 graduates in fiscal year 2003 alone.

Association officials select the award recipient based on significant educational contributions to test and evaluation.

— AFFTC Public Affairs